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## Oribatid mites from Bu Gia Map National Park (Southern Vietnam), with description of a new species of *Dolicheremaeus* (Tetracondylidae) (Acari: Oribatida)

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**ABSTRACT.** An annotated checklist of oribatid mite taxa of Bu Gia Map National Park (Southern Vietnam) with distributions is provided. We have registered 62 species, 46 genera, 31 families of which five species, six genera, two families were found for the first time from Vietnam. A new species of the genus *Dolicheremaeus*, *D. bugiamapensis* sp. nov., is described. This new species can be included in the *Dolicheremaeus* species group with developed prodorsal and notogastral condyles, localization of adanal setae *ad*<sub>3</sub> in preanal position, medium length of notogastral setae and clavate sensilli. However, it differs from all species of this group by a combination of the body size, length of adanal and aggenital setae; size and morphology of condyles, morphology notogastral setae, localization of lyrifissures *iad*, and the morphology of leg setae *u*.

**Key words:** acarology, taxonomy, zoogeography, Oribatid mites, checklist, Bu Gia Map National Park, Vietnam, new species, *Dolicheremaeus*.

### INTRODUCTION

The oribatid mite fauna of Southern Vietnam is poorly studied. Only the oribatid data with a focus on Dong Nai Biosphere Reserve (= Cat Tien National Park) are presented (ERMILOV and ANICHKIN 2010, 2011a; ERMILOV 2011; ERMILOV *et al.* 2012; and the other papers of authors).

A primary goal of this paper is to present an annotated checklist of oribatid mites of Bu Gia Map National Park, and also is to annotate those taxa, which are recorded for the first time from Vietnam.

In the course of taxonomic identification, we have found a new species of the genus *Dolicheremaeus* JACOT, 1938 (Tetracondylidae). A secondary goal of our paper is to describe this species. *Dolicheremaeus* is the large genus, comprising 172 species that are distributed in the Pantropical and Subtropical regions. At present, seven species of *Dolicheremaeus* were recorded in Vietnam (GOLOSOVA 1983; KRIVOLUTSKY *et al.* 1997): *D. aokii* BALOGH & MAHUNKA, 1967, *D. auritus* (AOKI, 1965), *D. bartkei* RAJSKI & SZUDROWICZ, 1974, *D. inaequalis* BALOGH and MAHUNKA, 1967, *D. lineolatus* BALOGH & MAHUNKA, 1967, *D. oginoi* (AOKI, 1965), *D. ornatus* BALOGH & MAHUNKA, 1967. Thus, this new species is the eighth Vietnamese representative and it is describe below as *Dolicheremaeus bugiamapensis* sp. nov.

The main generic characters of *Dolicheremaeus* are summarized by AOKI (1967), BALOGH and BALOGH (1992), CORPUZ-RAROS (2000). Vietnamese species of *Dolicheremaeus* are given in several keys (see AOKI 1967; BALOGH & MAHUNKA 1967; BALOGH & BALOGH 2002).

#### MATERIALS AND METHODS

Studies were performed in forests of Bu Gia Map National Park located in Phuoc Long district in north-eastern Binh Phuoc Province (Southern Vietnam). To the north-west, this park is bordered by Cambodia, and, to the east, it is bordered by Dac Nong Province. Bu Gia Map National Park is bounded by the coordinates 12°05' to 12°18'N and 107°03' to 107°14'E. Elevations range from below 100 to 738 m a.s.l. The topography of the park is dominated by low, rolling hills, dissected by river and stream valleys. The principal habitat type at the park is closed monsoon semi-deciduous broad-leaved lowland forests and open woodlands on hill slopes, which is dominated by bamboo in many areas, perhaps reflecting past disturbance.

The oribatid mite fauna have been recorded from 9 sites of Bu Gia Map National Park.

#### LIST OF COLLECTING SITES

BNP-11-1: 12°12'N, 107°12'E, 369 m a.s.l., under *Dipterocarpus alatus*, in dark loamy soil and litter (leaves and branches), 17–31 May 2011, coll. A.E. Anichkin.

BNP-11-2: 12°12'N, 107°12'E, 390 m a.s.l., under *Swintonia floribunda* with an admixture *Dipterocarpus turbinatus*, in dark loamy soil and litter (leaves and branches of *Swintonia floribunda*), 17–31 May 2011, coll. A.E. Anichkin.

BNP-11-3: 12°11'N, 107°12'E, 430 m a.s.l., Polydominant forest (Dilleniaceae, Lecythidaceae, Anacardiaceae, Verbenaceae, Irvingiaceae and others), in dark loamy soil and litter (leaves and branches), 17–31 May 2011, coll. A.E. Anichkin.

BNP-11-4: 12°10'N, 107°11'E, 550 m a.s.l., under *Dipterocarpus costatus* and *D. turbinatus* in dark loamy soil and litter (leaves and branches), 17–31 May 2011, coll. A.E. Anichkin.

BNP-12-1: 12°12'N, 107°12'E, 351 m a.s.l., Polydominant forest (Dilleniaceae, Lecythidaceae, Anacardiaceae, Verbenaceae, Irvingiaceae) in the bottom of the slope of the hill, dark loamy soil with and litter (leaves), 17–31 May 2011, coll. A.E. Anichkin.

BNP-12-2: 12°10'N, 107°12'E, 531 m a.s.l., Palm forest (*Arenga pinnata* (Wurmb) Merr. (1917)) in the slope of gorge, dark loamy soil and litter (palm leaves), 17–31 May 2011, coll. A.E. Anichkin.

BNP-12-3: 12°12'N, 107°12'E, 398 m a.s.l., mixed wood-bamboo forest in the middle of the slope of the hill, dark loamy soil and litter (leaves), 17–31 May 2011, coll. A.E. Anichkin.

BNP-12-4: 12°12'N, 107°12'E, 370 m a.s.l., Polydominant forest (Dipterocarpaceae) on the top of hill, dark loamy soil and litter (leaves), 17–31 May 2011, coll. A.E. Anichkin.

BNP-12-5: 12°12'N, 107°12'E, 388 m a.s.l., Polydominant forest (Anacardiaceae, Dipterocarpaceae, Verbenaceae, Irvingiaceae and others) in the middle of the slope of the hill, dark loamy soil and litter (leaves of Anacardiaceae and Dipterocarpaceae), 17–31 May 2011, coll. A.E. Anichkin.

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. All body measurements are presented in micrometers (µm). Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the ventral plate, to avoid discrepancies caused by different degrees of notogastral distortion. Notogastral width refers to the maximum width in dorsal aspect. Lengths of body setae were measured in lateral aspect. Formulae for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (femulus included). Formulae for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

General terminology used in this paper follows that of Grandjean (summarized by NORTON and BEHAN-PELLETIER (2009), WALLWORK (1962), AOKI (1967).

## RESULTS

In the course of studies of oribatid mite fauna of Bu Gia Map National Park we have registered 62 species (including one new species and seven not identified species – probably are new), 46 genera (including two genera not identified), 31 families of which five species, six genera, two families were found for the first time in Vietnam. An annotated checklist of recorded oribatid taxa is presented below.

### Checklist of oribatid mites of Bu Gia Map National Park<sup>1</sup>

#### **Hyhochthoniidae**

— *Eohypochthonius crassisetiger* AOKI, 1959. Locality: BNP-12-4

#### **Lohmanniidae**

— *Javacarus kuehnelti* BALOGH, 1961. Locality: BNP-11-1, BNP-12-3

<sup>1</sup>Except ptyctimous mites and Damaeidae.

- *Meristacarus sundensis* HAMMER, 1979. Locality: BNP-11-1, BNP-11-2, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-5

### **Trhypochthoniidae**

- *Afronothrus incisivus* WALLWORK, 1961. The genus and species are recorded for the first time from Vietnam. Locality: BNP-11-1, BNP-12-2, BNP-12-3
- *Archegozetes longisetosus* AOKI, 1965. Locality: BNP-11-1, BNP-12-2

### **Malaconothridae**

- *Malaconothrus geminus* HAMMER, 1972. Locality: BNP-11-1, BNP-11-2, BNP-12-3
- *Malaconothrus dorsofoveolatus* HAMMER, 1979. Locality: BNP-11-1, BNP-11-2, BNP-12-3

### **Nanhermanniidae**

- *Cosmohermannia robusta* AOKI, 1994. Locality: BNP-11-1, BNP-11-2, BNP-12-1, BNP-12-3
- *Cyrthermannia vicinicornuta* AOKI, 1965. Locality: BNP-12-3

### **Hermannidae**

- *Phyllhermannia gladiata* AOKI, 1965. Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-11-4, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-5

### **Neoliodidae**

- *Neoliodes* sp. Locality: BNP-11-2, BNP-11-4, BNP-12-1, BNP-12-3

### **Gymnodamaeidae**

- *Arthrodamaeus vietnamicus* ERMILOV and ANICHKIN, 2011. Locality: BNP-12-5
- *Gymnodamaeidae* sp. Locality: BNP-11-2

### **Microzetidae**

- *Berlesezetes ornatissimus* (BERLESE, 1913). Locality: BNP-12-3, BNP-12-4

### **Zetorchestidae**

- *Zetorchestes saltator* OUDEMANS, 1915. Locality: BNP-11-2, BNP-11-3, BNP-12-1, BNP-12-3, BNP-12-5

### **Eremulidae**

- *Eremulus avenifer* BERLESE, 1913. Locality: BNP-11-2, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-5

### **Heterobelbidae.** The family is recorded for the first time from Vietnam

- *Heterobelba stellifera* OKAYAMA, 1980. The genus and species are recorded for the first time from Vietnam. Locality: BNP-11-2

### **Oppiidae**

- *Neoamerioppia vietnamica* (MAHUNKA, 1988). Locality: BNP-11-1, BNP-11-2, BNP-12-3
- *Oppiella nova* (OUDEMANS, 1902). Locality: BNP-11-1, BNP-11-2, BNP-12-3, BNP-12-5
- *Taiwanoppia hungarorum* (MAHUNKA, 1988). Locality: BNP-11-2, BNP-11-4, BNP-12-1, BNP-12-2

### **Granuloppiidae**

- *Hammerella* sp. The genus is recorded for the first time from Vietnam. Locality: BNP-11-1, BNP-12-1, BNP-12-3, BNP-12-5

**Suctobelbidae**

— *Suctobelbella latirostris* (STRENZKE, 1950). Locality: BNP-11-1, BNP-11-2, BNP-12-3

— *Suctobelbella variosetosa* (HAMMER, 1961). Locality: BNP-11-2, BNP-12-1, BNP-12-2

— *Suctobelbilla multituberculata* HAMMER, 1979. Locality: BNP-11-2

**Tetracondylidae**

— *Dolicheremaeus aokii* BALOGH and MAHUNKA, 1967. Locality: BNP-11-2, BNP-12-1, BNP-12-2, BNP-12-3

— *Dolicheremaeus* sp. nov. Locality: BNP-12-3

**Otocephidae**

— *Otocephus duplicornutus* AOKI, 1965. Locality: BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4

— *Otocephus vietnamicus* ERMILOV and ANICHKIN, 2011. Locality: BNP-12-1, BNP-12-2, BNP-12-3

**Carabodidae**

— Carabodidae sp. Locality: BNP-11-1

**Tectocephidae**

— *Tectocephus velatus* (MICHAEL, 1880). Locality: BNP-11-1, BNP-12-2, BNP-12-5

**Microtegeidae**

— *Microtegeus borhidii* BALOGH and MAHUNKA, 1984. The species is recorded for the first time from Vietnam. Locality: BNP-11-1

— *Microtegeus reticulatus* AOKI, 1965. Locality: BNP-11-2, BNP-11-3, BNP-12-2, BNP-12-3

**Cymbaeremaeidae**

— *Scapheremaeus foveolatus* MAHUNKA, 1987. Locality: BNP-11-1

**Idiozetidae**. The family is recorded for the first time from Vietnam

— *Idiozetes javensis* HAMMER, 1979. The genus and species are recorded for the first time from Vietnam. Locality: BNP-11-1, BNP-12-3

**Oribatellidae**

— *Oribatella gerdweigmanni* ERMILOV and ANICHKIN, 2012. Locality: BNP-11-2, BNP-12-2

**Ceratozetidae**

— *Sphaerozetes* sp. The genus is recorded for the first time from Vietnam. Locality: BNP-11-1, BNP-12-2, BNP-12-3, BNP-12-5

**Mycobatidae**

— *Allozetes pusillus* (BERLESE, 1913). Locality: BNP-11-1, BNP-11-2, BNP-12-2, BNP-12-3, BNP-12-4, BNP-12-5

— *Lamellobates molecula* (BERLESE, 1916). Locality: BNP-11-1, BNP-11-3, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4

— *Paramellobates misella* (BERLESE, 1910). Locality: BNP-12-4

**Mochlozetidae**

— *Unguizetes cattienensis* ERMILOV and ANICHKIN, 2011. Locality: BNP-12-2

— *Unguizetes sphaerula* (BERLESE, 1905). Locality: BNP-11-1, BNP-11-4, BNP-12-1, BNP-12-2, BNP-12-4, BNP-12-5

**Scheloribatidae**

- *Scheloribates fimbriatus* THOR, 1930. Locality: BNP-11-1, BNP-11-3, BNP-12-1, BNP-12-2, BNP-12-3
- *Scheloribates latipes* (KOCH, 1844). Locality: BNP-11-1
- *Scheloribates praeincisus* (BERLESE, 1910). Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-11-4, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4, BNP-12-5
- *Tuberemaeus* sp. Locality: BNP-12-2

**Oripodidae**

- *Oripoda* sp. Locality: BNP-12-1

**Haplozetidae**

- *Peloribates kaszabi* MAHUNKA, 1988. Locality: BNP-11-2, BNP-12-1, BNP-12-2, BNP-12-4
- *Peloribates rangiroaensis* HAMMER, 1972. Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-11-4, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-5
- *Peloribates spiniformis* ERMILOV and ANICHKIN, 2011. Locality: BNP-11-1, BNP-12-4
- *Protoribates paracapucinus* (MAHUNKA, 1988). Locality: BNP-11-1, BNP-11-4, BNP-12-1, BNP-12-2, BNP-12-4, BNP-12-5
- *Trachyoribates ovulum* BERLESE, 1908. Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4
- *Vilhenabates sinatus* (AOKI, 1965). The genus and species are recorded for the first time from Vietnam. Locality: BNP-11-1, BNP-12-3, BNP-12-4

**Parakalummidae**

- *Neoribates jacoti* (BALOGH and MAHUNKA, 1967). Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-11-4, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4, BNP-12-5

**Galumnidae**

- *Galumna khoii* MAHUNKA, 1989. Locality: BNP-12-3
- *Galumna levisensilla* ERMILOV and ANICHKIN, 2010. Locality: BNP-11-1, BNP-12-2, BNP-12-3, BNP-12-4
- *Galumna pseudokhoii* ERMILOV and ANICHKIN, 2011. Locality: BNP-12-4
- *Neogalumna seniczaki* ERMILOV and ANICHKIN, 2010. Locality: BNP-12-3
- *Pergalumna pseudosejugalis* ERMILOV and ANICHKIN, 2012. Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4, BNP-12-5
- *Pergalumna indistincta* ERMILOV and ANICHKIN, 2011. Locality: BNP-11-1, BNP-11-2, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4, BNP-12-5
- *Pergalumna margaritata* MAHUNKA, 1989. Locality: BNP-11-1, BNP-11-2, BNP-11-3, BNP-12-1, BNP-12-2, BNP-12-3, BNP-12-4, BNP-12-5
- *Pergalumna yurtaevi* ERMILOV and ANICHKIN, 2011<sup>2</sup>. Locality: BNP-12-1, BNP-12-4
- *Trichogalumna nipponica* (AOKI, 1966). Locality: BNP-12-3

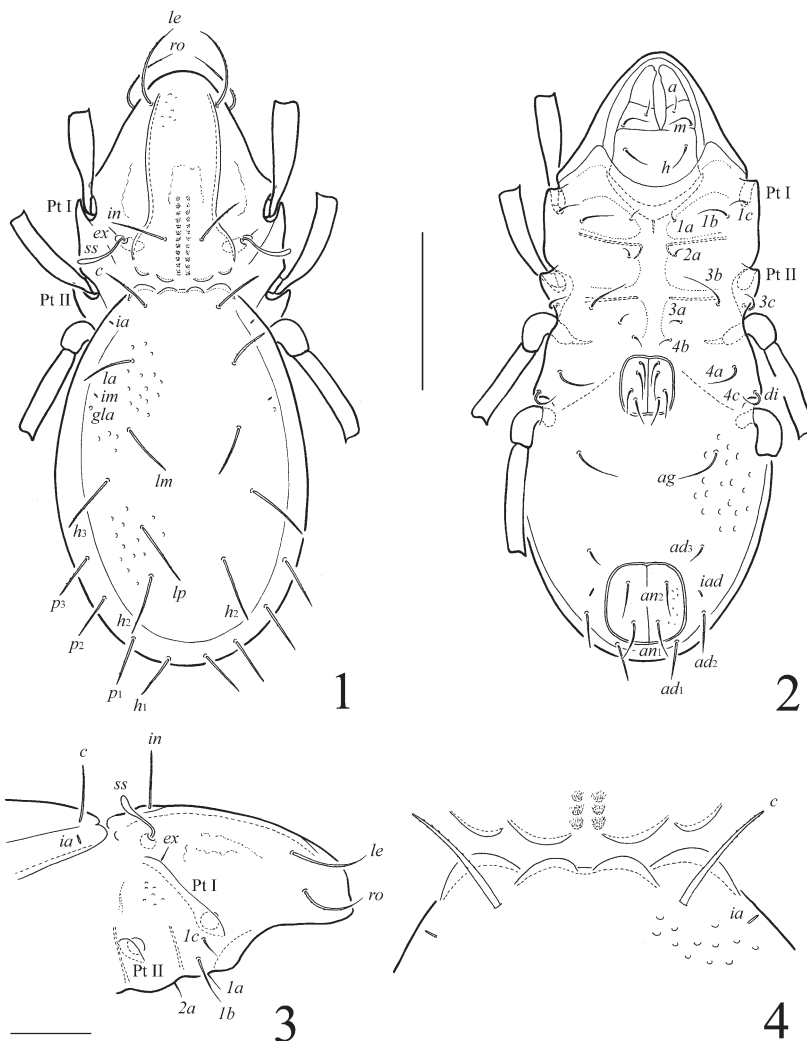
<sup>2</sup>Species was described from Cat Tien National Park by ERMILOV and ANICHKIN (2011b). Specimens from Bu Gia Map similar morphologically to original description of species, however, the new specimens have differentiations. So, body length of some specimens up to 830 and sensillar head can be rounded distally; also oblong postanal porose area present and the median pore inserted between porose areas A3. Hence, this should be indicated in any future identification of the species.

***Dolicheremaeus bugiamapensis* sp. nov.**

(Figs. 1–10)

## DIAGNOSIS

Body length 763–780 × 315–332. Notogaster and anogenital region foveolate. Sensilli clavate. Prodorsal and notogastral condyles developed, rounded distally. Notogaster with 10 pairs of notogastral setae. Adanal setae  $ad_3$  in preanal position, they shorter than aggenital setae. Leg setae  $u$  setiform on tarsi I, II and thorn-like on tarsi III, IV.



1–4. *Dolicheremaeus bugiamapensis* sp. nov.: 1 – dorsal view, only basal part of legs I–III present; 2 – ventral view, right legs I and II not shown, only basal part of legs present; 3 – lateral view of prodorsum, legs I and II and gnathosoma not shown; 4 – Prodorsal and notogastral condyles. Scale bar 1, 2: 200  $\mu$ m, scale bar 3: 100  $\mu$ m, scale bar 4: 50  $\mu$ m

## DESCRIPTION

*Measurements* – Body length 780 (holotype), 763 (paratype); body width 332 (holotype), 315 (paratype).

*Integument* – Body color yellow-brownish. Legs and genital plates brown. Surface of body covered by with poorly visible layer of granulate cerotegument (diameter of granules less than 1  $\mu\text{m}$ ). Notogaster and anogenital region foveolate (diameter of foveolae up to 12  $\mu\text{m}$ ).

*Prodorsum* (Figs. 1, 3–5) – Rostrum simple, broadly rounded in dorsal view. Rostral (*ro*, 90–94) and lamellar (*le*, 118–123) setae setiform, slightly barbed. Interlamellar setae (*in*, 69–73) weakly thickened, straight, barbed. Sensilli (*ss*, 86–90) clavate; head well developed, rounded distally, with poorly visible small barbs. All prodorsal condyles present, rounded distally. Median condyles larger than lateral condyles.

*Notogaster* (Figs. 1, 3, 4, 6) – All notogastral condyles present, rounded distally. Median condyles smaller than lateral condyles. Notogastral lateral condyles larger than both pairs of prodorsal condyles. Centrodorsal region bordered. Notogaster of holotype with 20 notogastral setae, notogaster of paratype with 19 notogaster setae (*h*<sub>3</sub> absent on right half). Setae of medium size (*c*, *la*, *lm* 73–77; *lp*, *h*<sub>2</sub>, *h*<sub>3</sub> 86–90; *h*<sub>1</sub>, *p*<sub>1</sub>–*p*<sub>3</sub> 61–69) weakly thickened, straight, barbed. Setae *h*<sub>2</sub> of holotype shorter (61) than in paratype. Lyrifissures (*ia*, *im*, *ip*,) and opisthosomal gland opening (*gla*) developed in typical arrangement for genus.

*Lateral part of body* (Figs. 1–3). – Exobothridial setae (*ex*, 24–28) straight and thin. Pedotecta I (Pt I) and II (Pt II) developed typically for genus. Discidia (*di*) triangular, blunt-ended. All lyrifissures (*ih*, *ips*) developed in typical arrangement for genus.

*Gnathosoma* (Fig. 2) – Typically for genus (ERMILOV et al. 2010).

*Epimeral region* (Fig. 2) – Epimeral setal formula: 3–1–3–3. Setae setiform, slightly barbed. Median setae (*1a*, *1b*, *2a*, *3a*) shorter than others.

*Anogenital region* (Figs. 2, 7, 8) – Four pairs of genital setae (36–41) and one pair of aggenital setae (*ag*, 61–65) setiform, with poorly developed barbs. Three pairs of adanal (*ad*<sub>1</sub>, *ad*<sub>2</sub>, 45–49, *ad*<sub>3</sub> 32–36) and two pairs of anal (*an*<sub>1</sub>, *an*<sub>2</sub> 49–53) weakly thickened, straight, slightly barbed. Adanal setae *ad*<sub>3</sub> in preanal position. Lyrifissures *iad* in inverse apoanal position.

Table 1. Leg setation and solenidia of *Dolicheremaeus bugiamapensis* sp. nov.

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	<i>v'</i>	<i>d</i> , ( <i>l</i> ), <i>bv''</i>	( <i>l</i> ), <i>v'</i> , $\sigma$	( <i>l</i> ), ( <i>v</i> ), $\varphi_1$ , $\varphi_2$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> ), <i>e</i> , $\omega_1$ , $\omega_2$
II	<i>v'</i>	<i>d</i> , ( <i>l</i> ), <i>bv''</i>	( <i>l</i> ), <i>v'</i> , $\sigma$	<i>l'</i> , ( <i>v</i> ), $\varphi$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> ), $\omega_1$ , $\omega_2$
III	<i>l'</i> , <i>v'</i>	<i>d</i> , <i>l'</i> , <i>ev'</i>	<i>l'</i> , $\sigma$	( <i>v</i> ), $\varphi$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> )
IV	<i>v'</i>	<i>d</i> , <i>ev'</i>	<i>d</i> , <i>l'</i>	( <i>v</i> ), $\varphi$	<i>ft''</i> , ( <i>tc</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> )

Roman letters refer to normal setae (*e* — famulus), Greek letters refer to solenidia. One apostrophe (') marks setae on anterior and double apostrophe (') setae on posterior side of the given leg segment.



*Legs* (Figures 13–16). Typically for genus (Ermilov et al., 2010). Formulae of leg setation and solenidia: I (1–4–3–4–16) [1–2–2], II (1–4–3–3–15) [1–1–2], III (2–3–1–2–15) [1–1–0], IV (1–2–2–2–12) [0–1–0]; homology of setae and solenidia indicated in Table 1. Solenidia  $\phi_1$  on tibiae I long, setiform; other solenidia of medium size, straight, blunt-ended. Leg setae *u* setiform (L-type) on tarsi I, II and thorn-like (S-type) on tarsi III, IV.

#### MATERIAL EXAMINED

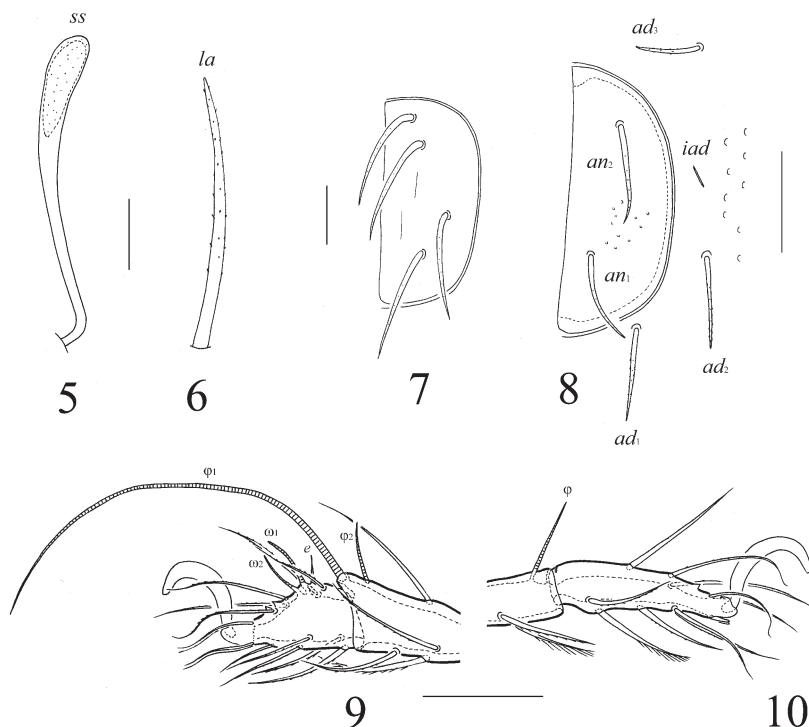
The holotype and paratype (both male) collected: BNP-12-3.

#### TYPE DEPOSITION

The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; paratype is deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia.

#### ETYMOLOGY

The specific name “*bugiamapensis*” refers to the park of origin, Bu Gia Map National Park.



5–10. *Dolicheremaeus bugiamapensis* sp. nov.: 5 – sensillus; 6 – notogastral seta *la*; 7 – genital plate, left; 8 – anal plate, left; 9 – tarsus and tibia of leg I, left, antiaxial view; 10 – tarsus and tibia of leg IV, left, antiaxial view. Scale bar 5–7: 20  $\mu$ m; scale bar 8–10: 50  $\mu$ m

## REMARKS

In having the presence of all prodorsal and notogastral condyles, localization of adanal setae  $ad_3$  in preanal position, medium length of notogastral setae and clavate sensilli, *Dolicheremaeus bugiamapensis* sp. nov. similar to *Dolicheremaeus alticola* BALOGH and BALOGH, 1986 from New Guinea, *Dolicheremaeus alveolatus* (OUDEMANS, 1915) from Ceylon, *Dolicheremaeus cicatricosus* MAHUNKA, 1991 from Borneo, *Dolicheremaeus nagpalae* CORPUZ-RAROS, 2000 from Philippines, *Dolicheremaeus repetitus* SUBÍAS, 2004 from New Guinea and *Dolicheremaeus triangularis* CORPUZ-RAROS, 2000 from Philippines. However, *Dolicheremaeus bugiamapensis* sp. nov. clearly differs from all these listed species as follows:

– from *Dolicheremaeus alticola* (see BALOGH and BALOGH 1986) by the larger body size ( $763\text{--}780 \times 315\text{--}332$  vs.  $406 \times 168$  in *D. alticola*), size of notogastral condyles (larger vs. smaller in *D. alticola*), length of adanal setae  $ad_3$  and aggenital setae ( $ad_3$  shorter than  $ag$  vs.  $ad_3$  longer than  $ag$  in *D. alticola*), length of adanal setae ( $ad_3$  shorter than  $ad_1$  and  $ad_2$  vs. all similar in *D. alveolatus*), morphology of leg setae  $u$  (L-L-S-S vs. L-L-L-L in *D. alticola*);

– from *Dolicheremaeus alveolatus* (see OUDEMANS 1917) by the larger body size ( $763\text{--}780 \times 315\text{--}332$  vs.  $560 \times ?$  in *D. alveolatus*), localization of notogastral setae (inserted between sensilli vs. inserted anteriorly to sensilli in *D. alveolatus*), size of notogastral condyles (larger vs. smaller in *D. alveolatus*), length of adanal setae  $ad_3$  and aggenital setae ( $ad_3$  shorter than  $ag$  vs.  $ad_3$  similar to  $ag$  in *D. alveolatus*); length of adanal setae ( $ad_3$  shorter than  $ad_1$  and  $ad_2$  vs. all similar in *D. alveolatus*);

– from *Dolicheremaeus cicatricosus* (see MAHUNKA 1991) by the larger body size ( $763\text{--}780 \times 315\text{--}332$  vs.  $398\text{--}460 \times 168\text{--}209$  in *D. cicatricosus*), length of notogastral setae  $h_1$  (similar to  $p_1$  and  $p_2$  vs. shorter than  $p_1$  and  $p_2$  in *D. cicatricosus*), length of adanal setae  $ad_3$  and aggenital setae ( $ad_3$  shorter than  $ag$  vs.  $ad_3$  longer than  $ag$  in *D. cicatricosus*), length of adanal setae ( $ad_3$  shorter than  $ad_1$  and  $ad_2$  vs. all similar in *D. cicatricosus*), localization of lyrifissures  $iad$  (in inverse apoanal position vs. in adanal position in *D. cicatricosus*), morphology of leg setae  $u$  (L-L-S-S vs. L-S-S-S in *D. cicatricosus*);

– from *Dolicheremaeus nagpalae* (see CORPUZ-RAROS 2000) by the larger body size ( $763\text{--}780 \times 315\text{--}332$  vs.  $466 \times 200$  in *D. nagpalae*), morphology of sensillar head (oblong vs. rounded in *D. nagpalae*), morphology of notogastral setae (straight vs. some setae with thin, curved tip in *D. nagpalae*), length of adanal setae  $ad_3$  and aggenital setae ( $ad_3$  shorter than  $ag$  vs.  $ad_3$  similar to  $ag$  in *D. nagpalae*), morphology of leg setae  $u$  (L-L-S-S vs. L-L-L-L in *D. nagpalae*);

– from *Dolicheremaeus repetitus* (see BALOGH 1968) by the by the larger body size ( $763\text{--}780 \times 315\text{--}332$  vs.  $387 \times 152$  in *D. repetitus*), morphology of posterior notogastral setae (straight vs. with thin, curved tip in *D. repetitus*), length of adanal setae  $ad_3$  and aggenital setae ( $ad_3$  shorter than  $ag$  vs. similar in *D. repetitus*);

– from *Dolicheremaeus triangularis* (see CORPUZ-RAROS 2000) by the larger body size ( $763\text{--}780 \times 315\text{--}332$  vs.  $559 \times 346$  in *D. triangularis*), morphology of median notogastral condyles (rounded distally vs. traingular in *D. triangularis*), length of adanal setae  $ad_3$  and aggenital setae ( $ad_3$  shorter than  $ag$  vs.  $ad_3$  longer than  $ag$  in *D.*

*triangularis*), length of adanal setae ( $ad_3$  shorter than  $ad_1$  and  $ad_2$  vs. all similar in *D. triangularis*), morphology of leg setae *u* (L-L-S-S vs. L-L-L-L in *D. triangularis*).

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